

- 1 -

DESCRIPTION

Solid Preparation Packaging Apparatus and
Packaging Paper Roll for Solid Preparation

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Technical Field

The present invention relates to a solid preparation packaging apparatus for packaging a solid preparation (hereinafter, the solid preparation refers to all solidified preparations such as a tablet, capsule, pill, and troche) designated by a prescription in a packaging paper in a hospital, pharmacy, and the like, and a packaging paper roll for the solid preparation for use in the solid preparation packaging apparatus.

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Background Art

In a hospital, and the like, a tablet filling machine disclosed, for example, in Japanese Patent Publication No. 59/1991 (A61J3/00) has heretofore been used to divide and package a plurality of types of solid preparations prescribed by a doctor for each one dosage so that the preparations are dispensed to a patient. In this case, the plurality of types of solid preparations are discharged for each one dosage via each tablet case, and collected by a hopper, conveyor, and the like, subsequently a packaging paper is drawn from a packaging paper roll and thermally welded, and the preparations are divided and

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packaged in small pouches.

Moreover, there is a tablet packaging apparatus for filling a bag or the like with each type of prescribed solid preparation and dispensing the preparation to a patient. In a structure of the packaging apparatus, the packaging paper roll having a packaging paper wound around a shaft member in a roll shape is attached in a predetermined position, an end of the packaging paper is drawn from the roll, and the paper is passed through various rollers, solid preparation chute section, heat seal mechanism, and the like.

Such a conventional packaging paper roll 100 and a packaging apparatus rotation shaft 101 with the roll attached thereto are shown in FIGS. 9 to 11. The conventional packaging paper roll 100 is constituted of a hollow tubular shaft member (hereinafter referred to as a paper tube) 102 of a boxboard shown in FIG. 10, and a packaging paper 20 wound around the member. The packaging paper 20 is used to contain and package the solid preparation, and constituted of a thermally fusible thin paper using an auxiliary medium of polyethylene or another thermally fusible material which melts at a predetermined temperature. The longitudinal paper with a predetermined width is wound around the shaft member 102 in a roll shape.

Moreover, the packaging paper 20 is folded into two from substantially a central portion of a width direction, and doubly folded/bent. A double folded/bent portion forms a folded portion 20A, and opposite ends of the double

folded/bent portion form an opening 20B (on a side opposite to the folded portion 20A). The packaging paper 20 is wound around the shaft member 102 in a double folded state, and the wound packaging paper 20 is drawn from a terminal end of the paper.

On the other hand, the rotation shaft 101 with the packaging paper roll 100 attached thereto is rotatably and vertically formed in a not-shown packaging apparatus, and a disc-shaped base plate 103 is disposed in a bottom portion of the roll. A plurality of spring members 104 directed downward from an upper end, expanding outwardly and descending are attached to a periphery of the rotation shaft 101, and a brake 106 driven by a solenoid is disposed under the base plate 103. The brake 106 abuts on the base plate 103 (rotation shaft 101), applies a resistance to rotation of the shaft and is disposed in order to adjust a tension applied to the drawn packaging paper 20.

Moreover, when the packaging paper roll 100 is attached to the rotation shaft 101, the rotation shaft 101 is inserted into shaft member 102 and the packaging paper roll 100 is laid on the base plate 103. In this case, the spring member 104 of the rotation shaft 101 expands outside from an inner diameter of the shaft member 102 in a stationary state, and the rotation shaft 101 advances into the shaft member 102 while the spring member 104 is compressed inward by the shaft member 102. Thereby, the spring member 104 is pressed onto an inner peripheral

surface of the shaft member 102 by its restoring force.

When the solid preparation is packaged, the packaging paper 20 is drawn from the packaging paper roll 100 attached to the rotation shaft 101, disposed along a predetermined path and used. However, since the conventional spring member 104 is pressed and connected to the inner peripheral surface of the shaft member 102, a slip is inevitably caused by deterioration with age. If the spring member 104 slips on the inner peripheral surface of the shaft member 102, a disadvantage occurs: even when the tension is applied to the packaging paper 20 as described above and the paper tries to be drawn, only the packaging paper roll 100 freely rotates.

In order to solve this problem, the spring member 104 is strengthened, or extended more outwardly so that a press-contact strength of the spring member 104 and shaft member 102 is increased. In this case, when the new packaging paper roll 100 is attached to rotation shaft 101, or when the shaft member 102 of the used packaging paper roll 100 is pulled from the rotation shaft 101, an excessively large force is required, and a replacing operation becomes excessively troublesome.

The present invention has been developed to solve the aforementioned conventional technical problem, and an object thereof is to provide a solid preparation packaging apparatus and a packaging paper roll for a solid preparation in which a slip can be prevented from being generated

between a packaging paper roll and a rotation shaft with the roll attached thereto by a simple constitution without inhibiting a replacing operation.

5 Disclosure of the Invention

According to the present invention, there is provided a solid preparation packaging apparatus comprising: a plurality of tablet cases in which respective types of solid preparations are contained; and a thermally fusible packaging paper wound around in a roll shape, so that the solid preparation discharged from the tablet case is packaged in the packaging paper, wherein the packaging paper is wound around a periphery of a shaft member detachably attached to a rotation shaft to form the roll shape, an engaging portion is formed in the rotation shaft, and an engaged portion attachably/detachably joined to the engaging portion is formed in the shaft member.

Moreover, in the solid preparation packaging apparatus of the present invention, the aforementioned engaging portion is formed to project outside from a base portion of the rotation shaft disposed in an upright manner, the shaft member has a hollow tubular shape, and the engaged portion is notched/formed in an edge of the shaft member.

Furthermore, in the solid preparation packaging apparatus of the present invention, a plurality of engaging portions and engaged portions are formed.

Additionally, according to the present invention,

there is a packaging paper roll for a solid preparation,
comprising: a hollow tubular shaft member; and a thermally
fusible packaging paper wound around a periphery of the
shaft member, wherein a notch is formed in an edge of the
5 shaft member.

Moreover, in the packaging paper roll for the solid
preparation of the present invention, a plurality of notches
are formed.

Furthermore, in the packaging paper roll for the
10 solid preparation, the notch is formed by cutting an edge of
the shaft member to an outer portion from an inner portion
of the edge.

Additionally, in the packaging paper roll for the
solid preparation of the present invention, the notch is
15 formed such that an inner portion of an edge of the shaft
member is cut/removed, and an outer portion thereof remains
uncut.

According to the present invention, since the
engaged portion is formed in the shaft member with the
20 packaging paper wound therearound in the roll shape, the
engaging portion formed on the rotation shaft of the solid
preparation packaging apparatus with the shaft member
attached thereto is attachably/detachably joined into the
engaged portion, so that the slip between the rotation shaft
25 and the shaft member can be prevented.

In this case, since a spring member is not pressed
onto the shaft member as in a conventional art, it is

extremely easy to attach/detach the shaft member to/from the rotation shaft, and therefore a replacing operation of the packaging paper roll is not inhibited. Particularly, when the engaging portion is formed to project outside from the base portion of the rotation shaft disposed in an upright manner, and the engaged portion is notched/formed in the edge of the hollow tubular shaft member, the engaging portion engages with the engaged portion in a final stage of a series of operation for inserting the rotation shaft into the shaft member, and therefore attaching operability is further enhanced.

Moreover, when a plurality of engaging and engaged portions are formed, an engaging relation of the shaft member and rotation shaft is further strengthened, and the slip can more firmly be prevented from occurring.

Furthermore, when the notch is formed by cutting the edge of the shaft member to the outer portion from the inner portion of the edge, the shaft member is easily formed, and a rise of component cost can be minimized.

Additionally, the notch is formed such that the inner portion of the shaft member edge is cut/removed and the outer portion thereof remains uncut. Then, a disadvantage that the edge of the shaft member is collapsed by a pressure during winding of the packaging paper can be prevented or inhibited.

Brief Description of the Drawings

FIG. 1 is a longitudinal side view of a solid preparation packaging apparatus of the present invention, FIG. 2 is a perspective view of a solid preparation packaging mechanism of the solid preparation packaging apparatus excluding a packaging paper roll according to the present invention, FIG. 3 is a side view of a periphery of a rotation shaft of the solid preparation packaging mechanism of the present invention, FIG. 4 is a perspective view of the rotation shaft and packaging paper roll in the present invention, FIG. 5 is a perspective view of a shaft member of the packaging paper roll of the present invention, FIG. 6 is a perspective view of the solid preparation packaging mechanism in which the packaging paper roll is being charged in the present invention, FIG. 7 is a side view of a heat seal mechanism in the present invention, FIG. 8 is a perspective view of the shaft member of the packaging paper roll according to another embodiment of the present invention, FIG. 9 is a perspective view of a conventional packaging paper roll, FIG. 10 is a perspective view of the shaft member of the packaging paper roll of FIG. 9, and FIG. 11 is a side view of the periphery of the rotation shaft of the conventional solid preparation packaging apparatus.

Best Mode for Carrying out the Invention

An embodiment of the present invention will be described hereinafter in detail with reference to the drawings. FIG. 1 is a longitudinal side view of a solid

preparation packaging apparatus 1 according to one
embodiment of the present invention, FIG. 2 is a perspective
view of a solid preparation packaging mechanism 14 of the
solid preparation packaging apparatus 1 excluding a
5 packaging paper roll 19 of the present invention, FIG. 3 is
a side view of a periphery of a rotation shaft 15 of the
solid preparation packaging mechanism 14, FIG. 4 is a
perspective view of the rotation shaft 15 and packaging
paper roll 19, FIG. 5 is a perspective view of a shaft
10 member 21 of the packaging paper roll 19, FIG. 6 is a
perspective view of the solid preparation packaging
mechanism 14 in which the packaging paper roll 19 is being
charged, and FIG. 7 is a side view of a heat seal mechanism
27.

15 The solid preparation packaging apparatus 1 of the
present invention is installed in a hospital, dispensing
pharmacy, and the like, and constituted of a solid
preparation containing mechanism 3 disposed in a rectangular
outer case 2, and the solid preparation packaging mechanism
20 14 disposed under the containing mechanism. A tablet case
container 5 of the solid preparation containing mechanism 3
is constituted in an upper portion of the outer case 2, and
an upper surface opening of the tablet case container 5 is
openably/closably closed by a top table 4.

25 A plurality of tablet cases 6 ... are contained in
the tablet case container 5, and a sub-container 7 is
disposed in a front upper portion of the container. The

sub-container 7 contains a solid preparation (e.g., a half cut tablet, and the like) which cannot be contained in the tablet case 6, and a not-shown belt conveyor (which may be connected via a chain, gear, and the like in this case) is driven by a belt 9 extended to a not-shown rotation shaft pulley of a motor 8. Moreover, a plurality of container divisions 7A are continuously disposed in the belt conveyor.

Moreover, discharge counters such as a not-shown photosensor are disposed under the respective tablet cases 6 The discharge counter is connected to the respective upper-side tablet cases 6 ..., and a motor driven type discharge drum is built in the counter. Furthermore, the discharge drum is structured such that solidified preparations such as a tablet, capsule, pill, and troche are inserted in one upper/lower row into a plurality of grooves in a side surface of the drum. Additionally, when the discharge drum rotates, the solid preparations are dropped one by one from each groove, and the number of the solid preparations is detected and counted by the photosensor.

Moreover, a drop path is formed in one end of the sub-containers 7 ..., and connected onto a turntable 10 described later. In the constitution, each solid preparation is contained in the container division 7A of the sub-container 7 as described above, and the solid preparations in the respective container divisions 7A ... drop one by one onto the turntable 10 from the drop path during rotation of the motor 8 by an operator's switch

operation.

The disc-shaped turntable 10 for collecting the solid preparations is disposed under the respective tablet cases 6 ... and the drop path, and this turntable 10 has a corresponding area under all the tablet cases 6 ... and drop path. A ridge 10A raised in a conical shape is formed in a center portion of the turntable 10, and the turntable 10 is rotated/driven at a predetermined speed by a not-shown turntable motor disposed under the ridge 10A.

Moreover, an annular guide 11 is disposed in an upright manner around the turntable 10, and a discharge port D is notched/formed in an appropriate portion of the guide 11. A chute 13 described later is disposed under the discharge port D, and in the constitution the solid preparations gathered on a guide 11 side by rotation of the turntable 10 drop into the chute 13. This chute 13 has an inverse four-sided truncated pyramid shape, the upper end opening thereof is disposed opposite to the discharge port D of the turntable 10, and a lower open end (tip end) thereof is disposed above the two-folded packaging paper 20 described later.

On the other hand, the solid preparation packaging mechanism 14 is disposed under the turntable 10. The solid preparation packaging mechanism 14 is constituted by disposing attaching means for attaching the packaging paper roll 19, guide means for guiding the drawn packaging paper 20 into a predetermined position, and drawing means for

pulling a tip end of the packaging paper 20 on a base 15. The packaging paper attaching means is, as shown in FIG. 3, constituted of a rotation shaft 16 rotatably and vertically disposed on the base 15, a disc-shaped base plate 17 positioned in a bottom of the rotation shaft 16 and projecting outside, a solenoid driven brake 18 disposed under the base plate 17 (between the base plate and the base 15), and the like.

The rotation shaft 16 has a cylindrical shape with an outer diameter which is substantially equal to (or slightly smaller than) an inner diameter of the shaft member 21 of the packaging paper roll 20 described later, and a plurality of engaging portions 16A projecting outside from the periphery at a constant interval are formed on a base portion as a base plate 17 side. This engaging portion 16A has a height of about 5 to 10 mm, and an outward projecting size thereof is substantially equal to a thickness of the shaft member 21. Moreover, the rotation shaft 16 is attachably/detachably inserted and fit into the shaft member 21 of the packaging paper roll 19.

Here, the packaging paper roll 19 of the present invention will be described. As shown in FIG. 5, the packaging paper roll 19 is constituted of the hollow tubular shaft member (usually referred to as a paper tube) 21 of a boxboard (a hard synthetic resin may be used), and the packaging paper 20 wound around the member. The packaging paper 20 is used to contain and package the solid

preparation, and constituted of a thermally fusible thin paper using an auxiliary medium of polyethylene or another thermally fusible material which melts at a predetermined temperature. The longitudinal paper with a predetermined width is wound around the shaft member 21 in the roll shape.

Moreover, the packaging paper 20 is folded into two from substantially a central portion of a width direction, and doubly folded/bent. A double folded/bent portion forms a folded portion 20A, and opposite ends of the double folded/bent portion form an opening 20B (on a side opposite to the folded portion 20A). The packaging paper 20 is wound around the shaft member 21 in a double folded state while the folded portion 20A is disposed on a lower edge of the shaft member 21. The wound packaging paper 20 is drawn from a terminal end of the paper (FIG. 4).

Furthermore, as shown in FIG. 5, a plurality of engaged portions 21A are notched/formed at a constant interval around a lower edge of the shaft member 21 of the packaging paper roll 19 of the present invention. The engaged portion 21A is formed by cutting the lower edge of the shaft member 21 to the outer portion from the inner portion of the edge in a rectangular shape, and sized and disposed such that the engaging portion 16A of the rotation shaft 16 can substantially tightly be fitted.

On the other hand, a tension lever 23 is disposed as guide means beside the rotation shaft 16 in the solid preparation packaging mechanism 14, and the tension lever 23

is extended between two rollers 24, 25. In this case, the roller 24 is fixed to the base 15, and the roller 25 can rock centering on the roller 24. The roller is biased in a direction apart from the rotation shaft 16 by a not-shown spring member. Moreover, a position of this roller 25 is detected by a not-shown switch. Additionally, a guide roller 26 is vertically disposed on the base 15 beside the roller 24.

A drawing roller 30 as drawing means is disposed on the base 15 on a opposite side of the tension lever 23 via the rotation shaft 16. The drawing roller 30 is constituted of a pair of narrow rubber rollers (i.e., rollers of a natural rubber, synthetic rubber, and the like) 33, 33A, and rotatably attached to upper ends of rotation shafts 32, 34. Moreover, the rotation shaft 32 with one rubber roller 33 attached thereto is a rotation shaft of a drawing motor 31.

Furthermore, the rotation shaft 34 of the other rubber roller 33A is biased by a not-shown coil spring, one rubber roller 33A is pressed onto the rubber roller 33 with a predetermined pressure, and in the constitution both the rubber rollers 33, 33A rotate by rotation of the drawing motor 31. Moreover, when the packaging paper 20 (on an opening 20B side) is held between both the rubber rollers 33, 33A, the packaging paper 20 is drawn from the packaging paper roll 19.

Additionally, the heat seal mechanism 27 is disposed between the guide roller 26 and the drawing roller 30. The

heat seal mechanism 27 for sealing the opening 20B of the packaging paper 20 by thermal welding and dividing the paper for each dosage is constituted of a pair of tentative heaters 28, 28 disposed opposite to each other at a predetermined interval, and a pair of main heaters 29, 29. Moreover, either one tentative heater 28 and main heater 29 include a not-shown operation apparatus, and are arbitrarily pressed onto or disconnected from the opposite tentative heater 28 and main heater 29. Furthermore, when the respective tentative heaters 28, and main heaters 29 are energized, the heaters are heated at a predetermined temperature.

Moreover, the main heaters 29, 29 are constituted of vertical portions 29A, 29A and parallel portions 29B, 29B, respectively, the parallel portion 29B has a width substantially equal to the width of the tentative heater 28, and the vertical portion 29A has a width double the width of the parallel portion 29B. Furthermore, when the packaging paper 20 is held and heated by the tentative heaters 28 on opposite sides, the packaging paper 20 is thermally welded from a folded portion 20A side to substantially a middle portion between the folded portion and the opening 20B (a range shown by a solid line arrow of FIG. 7 is not thermally welded/fixed).

Furthermore, the vertical portion 29A of the main heater 29 further holds and heats an upper portion above the portion heated and thermally welded by the tentative heaters

28 on opposite sides, and thermally welds and fixes the packaging paper 20 from the folded portion 20A side to the opening 20B, so that a pouch 36A having the opening 20B on one side is formed on a tentative heater 28 side.

5 Additionally, the parallel portion 29B is constituted to thermally weld the opening 20B on the opposite side of the tentative heater 28 (a size between the main heater 29 and the tentative heater 28 in this case).

10 After the packaging paper 20 is thermally welded by the heat seal mechanism 27, the paper moves by a predetermined distance on a drawing roller 30 side (in a direction of a hollow arrow of FIG. 7) by rotation of the drawing roller 30, that is, the portion thermally welded by the tentative heater 28 moves toward the main heater 29 (the
15 thermally welded portion of the main heater 29 between the folded portion 20A and the opening 20B). Subsequently, when the main heater 29 thermally welds the packaging paper 20, the pouch 36A having the opening 20B is successively formed between the tentative heater 28 and the vertical portion 29A
20 of main heater 29, and a thermally welded pouch 36 excluding the folded portion 20A is formed on the drawing roller 30 side.

Moreover, when the main heater 29 thermally welds the packaging paper 20 on the tentative heater 28 from the
25 folded portion 20A to the opening 20B, a plurality of perforation shaped holes 37 are cut/formed substantially in a center of the width of the thermally welded portion

(between the folded portion 20A and the opening 20B).

Thereby, three sides (remaining one side being the folded portion 20A) of the packaging paper 20 are thermally welded, the pouch 36 having all peripheries sealed is formed, and
5 the pouch 36 can be separated from a cut of the perforation shaped holes 37.

An operation procedure and action of the solid preparation packaging apparatus 1 constituted as described above according to the present invention will next be
10 described. First, the packaging paper roll 19 is attached to the rotation shaft 16. In this case, while the rotation shaft 16 is inserted into the shaft member 21, the packaging paper roll 19 is laid on the base plate 17. In this case, the engaging portions 16A ... of the base portion of the
15 rotation shaft 16 enters the engaged portions 21A ... of the lower edge of the shaft member 21 immediately before the packaging paper roll 19 abuts on the base plate 17.

Subsequently, when the packaging paper roll 19 is laid on the base plate 17, the engaging portions 16A ... of
20 the rotation shaft 16 are attachably/detachably joined into the engaged portions 21A ... of the shaft member 21. Here, for the packaging paper roll 19, as described above, the packaging paper 20 is folded into two and wound around the shaft member 21, and has the folded portion 20A and opening
25 20B. Therefore, if the packaging paper roll 19 is attached upside down, the folded portion 20A and opening 20B are reversed, and the solid preparation cannot be packaged in

the solid preparation packaging mechanism.

Additionally, a user has heretofore sometimes attached the packaging paper roll upside down to the solid preparation packaging mechanism. This is because the upper and lower ends of the packaging paper roll cannot easily be distinguished. In this case, the user does not first notice a mistake until the wrongly attached packaging paper is drawn and attached to the solid preparation packaging mechanism.

However, in the present embodiment, the engaged portions 21A ... of the shaft member 21 are formed only in the lower edge of the member. Therefore, even if the user attaches the packaging paper roll 19 upside down, the engaging portion 16A does not engage with the engaged portion 21A, and the wrong attachment can be avoided.

After the packaging paper roll 19 is attached to the rotation shaft 16, the packaging paper 20 of the packaging paper roll 19 is drawn from the tip end thereof, successively passed outside the rollers 25, 24 of the tension lever 23 and inside the guide roller 26, subsequently passed between the tentative heater 28 and main heater 29 (chute 13 is turned down), and drawn to the drawing roller 30 (FIG. 6).

Subsequently, the tip end of the packaging paper 20 is inserted between both the rubber rollers 33, 33A of the drawing roller 30, and the drawing motor 31 is driven. Then, the rubber rollers 33, 33A are pressed onto each other,

while the packaging paper 20 is pulled toward the opposite side (forward side) from the heat seal mechanism 27 side. Therefore, the packaging paper 20 is drawn by the drawing roller 30 and drawn forward.

5 Here, the roller 25 of the tension lever 23 moves toward the rotation shaft 16 when the tension of the packaging paper 20 becomes strong, and moves apart from the rotation shaft 16 when the tension becomes weak. Subsequently, the movement of the roller 25 is detected by
10 the switch as described above. When the roller is detached from the rotation shaft 16, the solenoid is driven by a not-shown controller, and the brake 18 is pressed onto the base plate 17. Subsequently, when the roller 25 moves toward the rotation shaft 16, the brake 18 is in turn disconnected.
15 Thereby, an appropriate tension is constantly added to the packaging paper 20 drawn from the packaging paper roll 19.

When the packaging paper roll 19 is attached to the rotation shaft 16 in this manner, and the solid preparation packaging apparatus 1 with the drawn packaging paper 20
20 attached thereto is operated, a counted value indicating the number of drops of the solid preparation is reset. Moreover, the tentative heater 28 and main heater 29 are heated at the predetermined temperature, and the turntable 10 is energized and constantly rotated. When an operator inputs
25 prescription data into a not-shown input apparatus (personal computer, and the like) based on a doctor's prescription, the discharge drum of the tablet case 6 with the solid

preparation contained therein is rotated/driven, and the type of solid preparation designated by the prescription data drops one by one onto the turntable 10. Moreover, the solid preparation also similarly drops onto the turntable 10 from the sub-container 7 in accordance with a user's arbitrary operation.

The number of solid preparations having dropped from the tablet case 6 is counted by the not-shown controller based on a photosensor output. When the counted number of dropped solid preparations agrees with the number of solid preparations based on the prescription data, the rotation of the discharge drum is stopped, and the dropping of the solid preparation ends. The solid preparations (including the solid preparations from the sub-container 7) having dropped onto the turntable 10 are moved toward the outside guide 11 and collected by a centrifugal force of the rotating turntable 10, and drop into the chute 13 disposed below the discharge port D of the guide 11. Thereby, the solid preparation is passed through the chute 13 and introduced into the pouch 36A of the packaging paper 20 positioned below the chute.

After the solid preparation is contained in the pouch 36A of the packaging paper 20 in this manner, the controller pulls the packaging paper 20 by the drawing roller 30, and thermally welds and seals the pouch in the heat seal mechanism 27 as described above.

Here, a not-shown shutter for entering the pouch 36A

and expanding the opening 20B is attached to the lower end of the chute 13. In this case, the tentative heater 28 of the heat seal mechanism 27 thermally welds the packaging paper 20 up to substantially the middle portion between the folded portion 20A and the opening 20B of the paper, and the upper portion of the paper is not thermally welded. Therefore, the packaging paper 20 can be drawn by the drawing roller 30 (in the direction of the arrow of FIG. 7) without lifting up the shutter of the chute 13.

Subsequently, when the packaging paper 20 stops moving, the packaging paper 20 is thermally welded again by the main heater 29, and the solid preparation is packaged into the pouch 36 and contained into the pouch 36A from the turntable 10 via the chute 13. This is repeated to automatically package a predetermined number of solid preparations of the type designated based on the prescription data.

With this drawing movement of the packaging paper 20, the shaft member 21 of packaging paper roll 19 and the rotation shaft 16 also rotate. Additionally, as described above, the engaged portions 21A ... are formed in the shaft member 21 of the packaging paper roll 19, and the engaging portions 16A ... attachably/detachably engaging the engaged portions 21A ... are formed in the rotation shaft 16.

Therefore, even when the brake 18 for applying the tension to the paper abuts on the base plate 17, the slip can firmly be prevented from occurring between the rotation shaft 16

and the shaft member 21.

In this case, the spring member is not pressed onto the shaft member 21 as in the conventional art. Therefore, the shaft member 21 can extremely easily be attached
5 to/detached from the rotation shaft 16, and the replacing operation of the packaging paper roll 19 is not inhibited. Particularly, since the engaging portions 16A ... are formed to project outside from the base portion of the rotation shaft 16 disposed on the base 15 in the upright manner, and
10 the engaged portions 21A ... are notched/formed in the lower edge of the hollow tubular shaft member 21, the engaging portions 16A ... engage with the engaged portions 21A ... in a final stage of a series of operation for inserting the rotation shaft 16 into the shaft member 21, and therefore
15 attaching operability is further enhanced.

Moreover, since a plurality of engaging portions 16A ... and engaged portions 21A ... are formed, an engaging relation of the shaft member 21 and rotation shaft 16 is further strengthened, and slip can more firmly be prevented
20 from occurring.

Additionally, in the present embodiment, the engaged portions 21A ... are formed by completely cutting the lower edge of the shaft member 21 of the packaging paper roll 19 as shown in FIG. 5. However, as shown in FIG. 8, the
25 engaged portions 21A ... are formed such that the inner portion of the lower edge of the shaft member 21 is cut/removed, and the outer portion thereof remains uncut.

Then, a disadvantage that the lower edge of the shaft member 21 is collapsed by a pressure during winding of the packaging paper 20 can be prevented or inhibited.

Additionally, in this case a projecting size of the engaging portion 16A of the rotation shaft 16 is adjusted in accordance with a size of the engaged portion 21A.

Moreover, in the present embodiment the present invention is applied to the apparatus for collecting the solid preparation by the turntable, but the present invention is also effective for the apparatus for collecting the solid preparation by a belt conveyor, and the like.

Possibility of Industrial Utilization

As described above, according to the present invention, since an engaged portion is formed in a shaft member with a packaging paper wound therearound in a roll shape, an engaging portion formed on a rotation shaft of a solid preparation packaging apparatus with the shaft member attached thereto is attachably/detachably joined into the engaged portion, so that a slip between the rotation shaft and the shaft member can be prevented.

In this case, since a spring member is not pressed onto the shaft member as in a conventional art, it is extremely easy to attach/detach the shaft member to/from the rotation shaft, and therefore a replacing operation of the packaging paper roll is not inhibited. Particularly, when the engaging portion is formed to project outside from a

base portion of the rotation shaft disposed in an upright manner, and the engaged portion is notched/formed in an edge of the hollow tubular shaft member, the engaging portion engages with the engaged portion in a final stage of a series of operation for inserting the rotation shaft into the shaft member, and therefore attaching operability is further enhanced.

Moreover, when a plurality of engaging and engaged portions are formed, an engaging relation of the shaft member and rotation shaft is further strengthened, and the slip can more firmly be prevented from occurring.

Furthermore, when the notch is formed by cutting the edge of the shaft member to an outer portion from an inner portion of the edge, the shaft member is easily formed, and a rise of component cost can be minimized.

Additionally, the notch is formed such that the inner portion of the shaft member edge is cut/removed and the outer portion thereof remains uncut. Then, a disadvantage that the edge of the shaft member is collapsed by a pressure during winding of the packaging paper can be prevented or inhibited.